What Is Claimed Is:

1. A membraneless exchange device for extracting components from a sample fluid, comprising:

first, second and third inlet channels;

first, second and third exit channels; and

a microfluidic extraction channel connected to the first, second and third inlet channels and the first, second and third exit channels, wherein laminar flows of a first extractor fluid, the sample fluid, and a second extractor fluid are established inside the extraction channel and wherein sheathing of the sample fluid by the first and second extractor fluids substantially limits contact between the sample fluid and the surfaces of the extraction channel.

2. The device of claim 1, wherein at least 90% of the sample fluid is sheathed by the first and second extractor fluids.

3. The device of claim 2, wherein at least 95% of the sample fluid is sheathed by the first and second extractor fluids.

4. The device of claim 1, wherein at least a portion of the sample fluid exits the device with the first extractor fluid through the first exit channel.

5. The device of claim 1, wherein advective transport of molecules within said extraction channel is substantially nonexistent.

6. The device of claim 1, wherein the composition of the first extractor fluid is substantially the same as the composition of the second extractor fluid.

7. The device of claim 1, wherein the sample fluid flow is between the first and second extractor fluid flows.

8. The device of claim 1, further comprising:

a first diverter formed from a portion of the first exit channel and a portion of the second exit channel; and

a second diverter formed from a portion of the second exit channel and a portion of the third exit channel.

9. The device of claim 8, wherein a first interface that is formed between the first extractor fluid flow and the sample fluid flow is aligned with at least a portion of the first diverter, and wherein a second interface that is formed between the second extractor fluid flow and the sample fluid flow is aligned with at least a portion of the second diverter.

10. The device of claim 1, wherein the sample fluid is blood fluid.

11. The device of claim 10, wherein the components extracted from the sample fluid are non-cellular components of the blood fluid.

12. The device of claim 1, wherein a first pump is used for controlling the flow of extractor fluid in the extraction channel and wherein a second pump is used for controlling the flow of sample fluid in the extraction channel.

13. The device of claim 12, wherein the first pump is an injection pump that controls the flow of extractor fluid into the extraction channel and wherein the device further comprises a withdrawal pump that controls the flow of extractor fluid out of the extraction channel.

14. The device of claim 1, wherein a source of extractor fluid is connected to said first inlet channel and wherein a source of sample fluid connected to said second inlet channel.

15. The device of claim 14, wherein the sample fluid is blood fluid and the source of sample fluid is a human being.

16. The device of claim 1, wherein the extraction channel has a height of less than 600 μm.

17. The device of claim 1, wherein the extraction channel has a width-to-height ratio of at least ten.

18. A system for extracting components from a sample fluid, comprising:

a device as defined by claim 1; and

a secondary processor that receives the first extractor fluid, the second extractor fluid and at least some of the components of the sample fluid upon exiting the extraction channel.

19. The system of claim 18, wherein said secondary processor is a membrane device.

20. The system of claim 18, wherein said secondary processor is a sorption device.

21. A system for performing hemodialysis, comprising:

a membraneless exchange device comprised of:

first and second dialysate inlet channels;

blood inlet and exit channels;

first and second dialysate exit channels; and

a microfluidic dialysis channel connected to the first and second dialysate inlet and outlet channels and the blood inlet and exit channels, wherein laminar flows of a first dialysate fluid, blood fluid, and a second dialysate fluid are established in order inside the dialysis channel, and wherein at least some of the components of the blood fluid exits the device through the first and second dialysate exit channels; and

a secondary processor that receives the dialysate fluid and the at least some of the components of the blood fluid exiting the device through the first and second dialysate exit channels.

22. The system of claim 21, wherein the secondary processor filters the dialysate fluid and the at least some of the components of the blood fluid exiting the device through the first

and second dialysate exit channels and returns the filtered fluid to the first and second dialysate inlet channels.

23. The system of claim 21, wherein the at least some of the components of the blood fluid are substantially non-cellular components of the blood fluid.

24. The system of claim 21, wherein sheathing of the blood fluid by the first and second dialysate fluids substantially limits contact between the blood fluid and the surfaces of the dialysis channel.

25. The system of claim 21, wherein the secondary processor is a membrane device.

26. The system of claim 21, wherein the secondary processor is a sorption device.

27. The system of claim 21, wherein the composition of the first dialysis fluid is substantially the same as the composition of the second dialysis fluid.

28. The system of claim 21, further comprising:

a first diverter formed from a portion of the first dialysate exit channel and a portion of the blood exit channel; and

a second diverter formed from a portion of the blood exit channel and a portion of the second dialysate exit channel.

29. The system of claim 21, further comprising:

a first pump for controlling the flow of dialysate fluid in the dialysis channel; and

a second pump for controlling the flow of blood fluid in the dialysis channel.

30. The system of claim 21, wherein the interface between the first dialysate fluid and the blood fluid is varied by adjusting the velocities of the laminar flows of the first dialysate fluid and the blood fluid.

31. The system of claim 21, wherein the interface between the blood fluid and the second dialysate fluid is varied by adjusting the velocities of the laminar flows of the blood fluid and the second dialysate fluid.

32. The system of claim 21, further comprising a reservoir for storing a viscosity agent, wherein the viscosity agent is be mixed with the first and second dialysate fluid to alter the viscosity of the first and second dialysate fluid.

33. The system of claim 21, further comprising a detector for detecting a presence of an undesired blood component within the dialysate fluid upon exiting the dialysis chamber.

34. The system of claim 33, wherein the detector is comprised of a photo detector.

35. The system of claim 33, wherein a first pump for controlling the flow of dialysate fluid in the dialysis channel is adjusted based on said detected presence of an undesired blood component within said dialysate fluid.

36. The system of claim 21, wherein the velocities of the laminar flows of the first dialysate fluid, the blood fluid and the second dialysate fluid are adjusted based on the detected presence of an undesired blood component within the first and second dialysate fluids.

37. The system of claim 21, wherein the first and second dialysate fluids are comprised of at least one of the following: a hyper osmolar solution, a solution high in glucose content, or a polyelectrolye osmotic agent.

38. A method for extracting components from a sample fluid, comprising:

establishing laminar flows of a first extractor fluid, the sample fluid and a second extractor fluid inside a microfluidic extraction channel, wherein sheathing of the sample fluid by the first and second extractor fluids substantially limits contact between the sample fluid and the surfaces of the extraction channel; and

withdrawing the first extractor fluid, the sample fluid and the second extractor fluid from the extraction channel such that at least a portion of the sample fluid is removed together with the first extractor fluid and the second extractor fluid and apart from the remainder of the sample fluid.

39. The method of claim 38, wherein the establishing laminar flows comprises:

providing first, second and third inlet channels; and

providing first, second and third exit channels.

40. The method of claim 38, further comprising:

providing the first and second extractor fluids and the at least a portion of the sample fluid to a secondary processor.

41. A method for performing hemodialysis, comprising:

establishing laminar flows of a first dialysate fluid, blood fluid and a second dialysate fluid inside a microfluidic extraction channel;

withdrawing the first dialysate fluid, the blood fluid and the second dialysate fluid from the extraction channel such that at least some of the components of the blood fluid are removed together with the first dialysate fluid and the second dialysate fluid and apart from the remainder of the blood fluid; and

providing the first and second dialysate fluids and the at least some of the components of the blood fluid to a secondary processor.

42. The method of claim 41, further comprising:

using the secondary processor to filter the first and second dialysate fluids and the at least some of the components of the blood fluid; and

returning the filtered fluid from the secondary processor to the extraction channel.

43. The method of claim 42, wherein sheathing of the blood fluid by the first and second dialysate fluids substantially limits contact between the blood fluid and the surfaces of the dialysis channel.